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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of: JOSEPH HONEIN §
Atty File: IM 1725 CIP

Serial No.: 10/035,998 §
Group Art Unit: 3634

Filed: 12/26/2001 §
Examiner: A. CHIN SHUE

For: COMPOSITE SCAFFOLDING PLANK AND METHOD OF FORMING SAME

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

THIS BRIEF IS SUBMITTED IN RESPONSE TO THE NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF MAILED 12/23/2005.

1. Transmitted herewith is the APPEAL BRIEF in this application with respect to the Notice of Appeal.

2. **STATUS OF APPLICATION**

This application is on behalf of
[ ] other than a small entity
[X] small entity

3. [ ] Applicant hereby petitions for an extension of time of (1) month for filing the Brief from the Notice of Appeal filed_____ as provided in 37 CFR 1.136 (a).
[ ] a fee in the amount of $ 120.00
[ ] is enclosed
[ ] charge to Deposit Account No. 10-0740. (Duplicate notice enclosed.)
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4. **FEE FOR FILING APPEAL BRIEF**

Pursuant to 37 CFR 1.17(f) the fee for filing the Appeal Brief is:
[X] small entity $250.00
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5. **FEE PAYMENT**

[ ] Attached is a check in the sum of
[ ] If any additional fee is required, charge Acct. No. 10-0740 .
This sheet is presented in duplicate.
[X] fee previously paid.

Respectfully submitted,

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Date: 01/23/2006

CERTIFICATE OF MAILING

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Kenneth H. Johnson

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For: COMPOSITE SCAFFOLDING PLANK AND METHOD OF FORMING SAME

BRIEF ON APPEAL

Commissioner for Patents
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I.
REAL PARTY IN INTEREST

The real party in interest is the inventor, Joseph HONEIN.

II.
RELATED APPEALS

There are no related appeals or interferences of applicant, Joseph HONEIN, known to appellant or appellant's legal representative which will directly or indirectly affect or be affected by or have a bearing on the Board's decision in this appeal.

III.
STATUS OF CLAIMS

Claims 1-13 and 16 remained in the application. All of the claims are rejected.

IV.
STATUS OF AMENDMENTS

All amendments have been entered of record.

V.
SUMMARY OF THE CLAIMED SUBJECT MATTER

The present claimed subject matter is a composite scaffolding plank made from two or more wooden boards by positioning the boards in side by side parallel abutment and embedding a plurality of spaced pins transversely through the boards and to increase the strength of a wooden plank by cutting the plank longitudinally, positioning the resulting sections in side by side parallel abutment with the wood grains in alternating directions and embedding a plurality of spaced pens in the sections (spec., page 7, ln. 6-15 and Fig. 2).

The boards are compressed laterally by an external force in the boring and pinning steps such that after the manufacture when the boards are no longer compressed by an external force used in the manufacturing process, the wooden boards are held together in compression by the helical pins and holds the boards in tight abutment. (spec. page 10, ln. 5-14).

Preferably each board has a fiber bending value of at least 2200 psi, a modulus of

elasticity in the range of $1.6x10^6$ to $1.8x10^6$. (spec. page 19, ln. 7-9).

VI.
GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

GROUND 1. THE REJECTION OF CLAIM 16 AS OBVIOUS UNDER 35 USC 103(a) OVER ANGUERA '191OR LARSEN OR LARSEN IN VIEW OF ANGUERA.

GROUND 2. THE REJECTION OF CLAIMS 1-5, 7-12 AS OBVIOUS UNDER 35 USC 103(a) OVER LARSEN IN VIEW OF ANGUERA '191.

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GROUND 4. THE REJECTION OF CLAIMS 6 AND 13 AS OBVIOUS UNDER 35 USC 103(a)OVER LARSEN IN VIEW OFANGUERA '191 IN FURTHER VIEW OF BOUTON IN FURTHER VIEW OF JAPANESE '022

Copies or translations of the references cited by the examiner and relied on in the rejections are attached in (IX) EVIDENCE APPENDIX: U.S. 2,567,191 (ANGUERA '191); DK 84807 (LARSEN); U.S. 2,569,450 (BOUTON) and JP 01267002 A (JPN 002).

VII.
ARGUMENT

GROUND 1. THE REJECTION OF CLAIM 16 AS OBVIOUS UNDER 35 USC 103(a) OVER ANGUERA '191OR LARSEN OR LARSEN IN VIEW OF ANGUERA.

The present claim requires "plurality of wooden boards held together in compression by a plurality of helical pins, each of said pins having a square cross section, each said wooden board having a fiber bending value of at least 2200 psi and a modulus of elasticity in the range of $1.6x10^6$ to $1.8x10^6$". Anguera '191 combines green wood strips of varying length disposed in an upright position in a row with other green strips, thus describing the wood grain of each strip being aligned in the same direction for each strip (plank). Anguera '191 clamps the boards drills a bore, moves the work piece and inserts a pin into a

previously drilled hole. Anguera '191 uses pins with a square cross section and spiral threads. There is no teaching regarding the strength of the individual boards or the need for compression of the boards by the pin inserted in the hole.

Larsen discloses planks held together by U clamps and notes that in the prior art it was known that planks arranged side by side could be penetrated and held together by a transverse metal rod at the ends. Larsen shows a scaffolding with two adjacent planks having a pin 5 extending there through the plank. According to translation, "the surface elements comprise multiple planks arranged side by side and penetrated and held together by a transverse connecting iron at each end of the element" (page 2, third paragraph). No information is provided on the process of attaching the elements together other than the pins 5 are driven through holes 7. The Larsen disclosure is the use of the U shaped clamp which drops over a rod 5 in each of two abutting elements and over a cross member 12. Driving the pin 5 through a hole 7 is not a suggestion or disclosure to place the pin in the boards under compression as recited in the present claims.

Larsen provides no information on the process of attaching the elements together. However, since the walkway is to be "assembled easily and quickly", the pins are loosely fitted into the boreholes, so they can be removed and the system assembled elsewhere. This disclosure has no suggestion to any aspect of the present invention and is only of interest as "state of the art". The examiner's assertion that by binding the boards together the boards are held in compression, is totally unsupported by any disclosure in the reference. There is no art of record which would indicate that a pin (nail) driven into a board to bind the boards together places the boards in a compressed relationship. In order to obtain the compressed relationship recited in the present claims, the boards are

compressed by the manufacturing machine, then pinned together while compressed. Larsen has the pins loosely fitted into the boreholes, so they can be removed and the system assembled elsewhere. Larsen is making boards which are the opposite from the present boards, i.e., the boards are made for permanent binding under compression to replace large single board scaffold planks. A claimed invention which involves doing what the reference tries to avoid is the very antithesis of obviousness. *In re Buehler*, 185 USPQ 781(CCPA 1975).

Larsen has no suggestion to any aspect of the present invention and is of only interest as "state of the art". Relevant to the present claims, Anguera '191 uses pins with a square cross section and spiral threads to pin the boards together, other than that none of the other limitations of the present claims are disclosed or suggested by the proposed combination. Furthermore, at no point in Anguera '191 or Larsen are the wooden boards taught to have either a fiber bending value of at least 2200 psi or a modulus of elasticity in the range of $1.6x10^6$ to $1.8x10^6$. Thus, neither reference contributes any teaching not already found in the other reference.

The application of 35 USC §103 to the issue of patentability has been considered by the Supreme Court of the United States in *Graham v. John Deere*, 383 US 1, 148 USPQ 459 (US SupCt 1966). The Supreme Court held that 35 USC §103 requires a three-pronged inquiry. It is necessary to:

(i) determine the knowledge disclosed in the prior art;

(ii) determine the differences between the teaching of the prior art and the claims at issue; and

(iii) resolve the differences between the teaching of the prior art and the claims

in question on the level of the ordinary skill in the art field.

The claim is specific in the two important limitations of the present invention the compression from the pins and the strength of the individual members, neither of which is addressed let alone disclosed in the reference. The knowledge in the prior art (these references) does not include or suggest the claim elements. Instead the examiner begs the issue with "obvious mechanical expedient".

This resort to a clichéd extension of the knowledge of one of ordinary skill in the art in the face of the total absence, even in non analogous art, to include the invention does not represent a proper basis for maintenance of the rejection of the present claims. Begging the issue by a term such as "obvious mechanical expedient" does not apprise applicant of the basis of the rejection. It may be a "obvious mechanical expedient" or similar connotation but how can this make it less of an invention. (See *In re Bezombes, et al.,* 164 USPQ 387). Most inventions are "obvious mechanical expedients" arranged in non obvious manner.

To be used as a reference, the reference should be enabling. The question is does the disclosure of Anguera '191 or Larson or the combination put the claimed invention in the possession of the public? See *In re Payne, et al.*, 606 F2d 303, 314, 203 USPQ 245, 255 (CCPA 1979). As the court held in *Beckman Instruments Inc. v. LKB Produkter AB*, 892 F2d 1547, 1551, 13 USPQ2d 1301, 1307 (Fed. Cir. 1989):

> "In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method"

This rejection must fail, since the references alone or combined fail to meet the

basic standards required for obviousness.

GROUND 2. THE REJECTION OF CLAIMS 1-5, 7-12 AS OBVIOUS UNDER 35 USC 103(a) OVER LARSEN IN VIEW OF ANGUERA '191.

CLAIMS 1-5, 7-12

These claims are more detailed in the principal limitation set out in broad claim 16, in that it is required that:

> "a plurality of wooden boards each having a fiber bending value of at least 2200 psi, a modulus of elasticity in the range of $1.6x10^6$ to $1.8x10^6$"
>
> and
>
> "at least three bores extending through said plurality of wooden boards in a first direction; at least three spaced helical pins extending transversely in a second direction opposite to said first direction through and imbedded in said bores in said plurality of wooden boards, said plurality of wooden boards being under compression, normal to said wooden board sides and normal to said lengthwise direction;"

Larsen and Anguera are discussed above and the failure of the combination to add any disclosure of one to the other and incorporated herein.

Contrary to the examiner's assertion Larsen does not show the claimed planks, since there are two essential recitations, that of the property of each board and the manner of engaging them. and driving the pin 5 through a hole 7 is not a suggestion or disclosure to place the pin in the boards under compression as recited in the present claims. The examiner fails to realize that the prior art did not seek to compressively engage the boards together, they only sought and taught that the boards be placed together and held in place to form a platform. Unfortunately the safety of the workmen was, at the time of this art, not a significant concern and the references are only addressing the simple physical

achievement of the goal of making a platform for a task.

Contrary to the examiner's assertion Larsen only shows a plurality of planks. it does not show or suggest any other limitations of the claims.

The application of 35 USC §103 to the issue of patentability has been considered by the Supreme Court of the United States in *Graham v. John Deere*, *supra.*

The claims are specific in the multiple limitations including those of broad claim 16, none of which is addressed let alone disclosed in the references. The knowledge in the prior art (these references) does not include or suggest the claim elements. Instead the examiner begs the issue with "obvious mechanical expedient".

This resort to a clichéd extension of the knowledge of one of ordinary skill in the art in the face of the total absence, even in non analogous art, to include the invention does not represent a proper basis for maintenance of the rejection of the present claims. Begging the issue by a term such as "obvious mechanical expedient" does not apprize applicant of the basis of the rejection. It may be a "obvious mechanical expedient" or similar connotation but how can this make it less of an invention. (See *In re Bezombes, supra.*).

To be used as a reference, the reference should be enabling. The combination of of Anguera '191 and Larsen does not put the claimed invention in the possession of the public. See *In re Payne, et al.*, *supra* and *Beckman Instruments Inc. v. LKB Produkter AB*, *supra*.

This rejection must fail, since the references alone or combined fail to meet the basic standards required for obviousness and the examiner has failed to make out a *prima*

facie case of obviousness here.

GROUND 3. THE REJECTION OF CLAIMS 9-11 AS OBVIOUS UNDER 35 USC 103(a) OVER LARSEN AND IN VIEW OF ANGUERA '191 AND IN FURTHER VIEW OF BOUTON.

CLAIMS 9-11

The rejected these claims with claims 1-5 and 7-12 over this art has been discussed above and is incorporated herein. This rejection is cumulative to the other rejection and a tacit admission by the examiner that the first rejection is deficient. Claims 9-11 depend from claim 7, and are detailed recitations of preferred board properties.

Bouton discloses a platform for use in scaffolding made by a clamp that extends over the upper and lower surfaces of the platform made of several side by side planks. The clamp has a hinge at one end of the two arms and at the other end a collar engages the two arms which are drawn together by a screw bolt to draw the two arms to tighten down on the planks and hold them in place. Since Bouton did not physically attach the boards together, it is submitted not to be relevant art, any more so than a catalogue from a mill listing various sizes of boards. Thus, Bouton does not provide any teaching to cure the deficiencies of Anguera '191 or Larsen no *prima facie* case of obviousness is made out and is rebutted by the absence of relevant content.

GROUND 4. THE REJECTION OF CLAIMS 6 AND 13 AS OBVIOUS UNDER 35 USC 103(a)OVER LARSEN IN VIEW OF ANGUERA '191 IN FURTHER VIEW OF BOUTON IN FURTHER VIEW OF JAPANESE '022.

CLAIMS 6 AND 9

The Larsen, Anguera and Bouton reference and the relationships and teach are discussed above and incorporated herein. The Japanese reference (JPN 002) according to the examiner cited to show "the method of alternating the wood grains in side-by-side

boards to enable high pressure resistance to warpage."

The Japanese reference (JPN 002) according to the examiner is cited to show "the method of alternating the wood grains in side-by-side boards to enable high pressure resistance to warpage."

JPN 002 discloses making a door with high resistance to warping by contact bonding a plurality of tie plates arranged with the wood grain in opposite directions together. After the door is formed splines (Fig. 1) or pins (Fig. 2) can be added.

JPN 002 does not pin the plates together, but glues them together. There is no suggestion that gluing is the equivalent of the pinning and even though Fig 2 would seem to show pins or rods through the glued plates, these are shown as equivalent to the splines, which have no relevance in regard to the present invention or claims. In the present invention placing the wooden planks side by side in parallel abutment with the wood grains in alternating directions increases the strength (spec., page 5, ln. 19-22) and has nothing to do with warping. Thus there would be no motivation to employ any information or only selected portions thereof from JPN 002 with any of the other applied references.

Rejections based on §103 must rest on a factual basis with these facts being interpreted without hindsight reconstruction of the invention from the prior art. The examiner has the initial duty of supplying the factual basis for the rejection. The examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis. See *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967). Even if the teachings of four references can be combined, there is no factual basis from which to

conclude that the apparatus resulting from the combined teachings would include the combination of elements of appellant's invention. "A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided by the prior art references and the then-accepted wisdom in the field." *In re Kotzab*, 217 F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). When one considers the rejection in this light, the evidence is seen to be inadequate to support the rationale as advanced by the examiner. The teachings of JPN 002 do not support a broader interpretation of Larsen or Anguera with regard to the limitations of compression and broad properties of the present invention.

Conclusion

The claims as limited to the preferred wood (spec. page 19, lines 8-9), which define the preferred plank contemplated, is not suggested by any reference of record. There is no motivation or suggestion to make the combination of art proposed for any of groupings.

There is no *per se* rule of obviousness that eliminates the need for fact-specific analysis of claims and the prior art and that the use of such a rule must stop. See *In re Ochiai*, 37 USPQ2d 1127, 1132 (Fed. Cir. 1996). The examiner is not applying the prior art to the claims because there is no disclosure of the specific limitations, but is rather using silence as evidence. The examiner's bare statement that steps are "obvious mechanical expedients" is completely unsupported by any evidence and therefore has no weight. The examiner has failed to make out a *prima facie* case of obviousness because he has used a legal conclusion as evidence. Inventions are obvious over references and

the examiner has not cited any reference to support his legal conclusions.

A determination of obviousness must involve more than indiscriminately combining prior art; a motivation or suggestion to combine the art must exist. *ACS Hosp. Sys., Inc. v. Montefiore Hosp.* 221 USPQ 929,933 (Fed. Cir. 1984). Such a suggestion may come from the references themselves, from references and disclosures in references known to be of importance in the particular field, and from the nature of the problem, leading inventors to look to references to possible solutions for the problem. *Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.,* 37 USPQ2d 1626, 1630 (Fed. Cir. 1996). In the present situation the record contains no evidence of a motivation (the mere assertion by the examiner that it would be obvious to make the combination not being one of the enumerated methods to present such evidence).

The present invention can be achieved only by fallacious inductive reasoning to combine the cited references.

It requested that the final rejection be reversed.

Respectfully Submitted,

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on 01/23/2006

KENNETH H. JOHNSON

VIII.
CLAIMS APPENDIX

1. A composite scaffolding plank comprising:

a plurality of wooden boards each having a fiber bending value of at least 2200 psi, a modulus of elasticity in the range of $1.6x10^6$ to $1.8x10^6$, a lengthwise direction, two opposing sides being flat and extending parallel to said lengthwise direction, each of said sides having a height, said height being the smallest dimension of said wooden boards;

said plurality of wooden boards positioned in side to side parallel abutment;

at least three bores extending through said plurality of wooden boards in a first direction;

at least three spaced helical pins extending transversely in a second direction opposite to said first direction through and imbedded in said bores in said plurality of wooden boards, said plurality of wooden boards being under compression, normal to said wooden board sides and normal to said lengthwise direction; and

said plurality of wooden boards being held together in compression by said helical pins.

2. A composite scaffolding plank as in claim 1 wherein said plurality of wooden boards comprise three of said wooden boards.

3. A composite scaffolding plank as in claim 1 wherein:

each of said plurality of wooden boards having a length and including a top and two opposing ends;

said wooden board tops being co-planar;

said wooden board lengths being substantially equal; and

said wooden board ends forming a substantially continuous surface.

4. A composite scaffolding plank as in claim 1 further comprising:

said plurality of wooden boards having a transverse bore extending substantially therethrough for each of said helical pins;

so that said transverse bore facilitates placement of said corresponding helical pin in said

plurality of wooden boards.

5. A composite scaffolding plank as in claim 1, wherein each of said at least three spaced helical pins has a square cross section.

6. A composite scaffolding plank as in claim 2, wherein said three wooden boards comprise a middle board and two outer boards;

said three wooden boards each having a wood grain direction; wherein

said middle board is oriented such that the direction of said wood grain of said middle board alternates against said wood grain direction of said two outer boards.

7. A composite scaffolding plank comprising:

a plurality of wooden boards;

each said wooden board having a fiber bending value of at least 2200 psi, a modulus of elasticity in the range of $1.6x10^6$ to $1.8x10^6$ and a rectangular prism shape;

each said wooden board having a length, a first end surface, a second end surface, a top surface, a bottom surface, and two opposing side surfaces;

each said side surface being narrower than said top surface, said top surface having a width equal to a width of said bottom surface;

said plurality of wooden boards positioned with at least one of said side surfaces

of each said wooden board in parallel abutment to at least one side surface of another said wooden board;

said top surfaces of said wooden boards being co-planar;

at least three bores extending through said plurality of wooden boards in a first direction;

at least three spaced helical pins extending transversely in a second direction opposite to said first direction through and imbedded in said bores in said plurality of wooden boards, normal to said opposing side surfaces; and

said plurality of wooden boards being held together in compression by said helical pins.

8. A composite scaffolding plank as in claim 7, further comprising:

all said first end surfaces of said plurality of wooden boards being co-planar; and

all said second end surfaces of said plurality of wooden boards being co-planar.

9. A composite scaffolding plank as in claim 8, wherein said plank has a nominal height of 2" and a combined nominal width of 10".

10. A composite scaffolding plank as in claim 9 wherein said plurality of wooden boards comprise a first wooden board, a second wooden board and a third wooden board.

11. A composite scaffolding plank as in claim 10, wherein:

said top surface and said bottom surface of said first wooden board have a nominal width of 4";

said top surface and said bottom surface of said second wooden board have a nominal width of 3";

said top surface and said bottom surface of said third wooden board have a nominal

width of 4";

said opposing side surfaces of said first wooden board have a nominal height of 2";

said opposing side surfaces of said second wooden board have a nominal height of 2"; and

said opposing side surfaces of said third wooden board have a nominal height of 2".

12. A composite scaffolding plank as in claim 7, wherein all said lengths of said plurality of wooden boards are approximately equal.

13. A composite scaffolding plank as in claim 7, wherein said plurality of wooden boards comprises a middle board and two outer boards;

said plurality of wooden boards each having a wood grain direction; wherein

said middle board is oriented such that the direction of said wood grain of said middle board alternates against said wood grain direction of said two outer boards.

16. A composite scaffolding plank comprising a plurality of wooden boards held together in compression by a plurality of helical pins, each of said pins having a square cross section, each said wooden board having a fiber bending value of at least 2200 psi and a modulus of elasticity in the range of $1.6x10^6$ to $1.8x10^6$.

IX.
EVIDENCE APPENDIX

Copies or translations of the references cited by the examiner and relied on in the rejections:

U.S. 2,567,191 (ANGUERA '191) patent

DK 84807 (LARSEN) patent and translation

U.S. 2,569,450 (BOUTON) patent

JP 01267002 A (JPN 002) translation

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English Translation of Japanese Patent (JP 01267002A)

Alvin C. Chin-Shue
Examiner
Art Unit: 1634

PTO 2005-5734

Japanese Kokai Patent Application
No. Hei 1[1989]-267002

DOOR AND CONSTRUCTION METHOD THEREFOR

Eugene X. Anglehart

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C AUGUST 2005
TRANSLATED BY THE RALPH MCELROY TRANSLATION COMPANY

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DOOR AND CONSTRUCTION METHOD THEREFOR

[Tobira oyobi sono kosei hoho]

Inventor:	Eugene X. Anglehart
Applicant:	Eugene X. Anglehart

[Amendments have been incorporated into the text of the translation. The amendment to this patent is a clean copy of figures only. No changes were made to the text.]

Claims

1. As a door construction method,

a construction method that includes:

a. a step for adhering multiple lumber tie plates of roughly equal length together side-by-side, with the grain of the adhered lumber tie plates arranged in opposite directions.

b and that includes a step for forming at least one open part that passes cuts across said lumber tie plates.

c. and for inserting a spline into said open part.

2. A construction method such that said lumber tie plate has side surfaces that are no more than 63.5 mm (2-1/2 inches) wide and parallel, in the door construction method described in Claim 1.

3. A construction method such that two open parts – said one open part near one end of said lumber tie plate and a second open part near the opposite ends of said lumber tie plate – are formed, in the door construction method described in Claim 1.

4. A construction method such that said open part is a hole, in the door construction method described in Claim 1.

5. A construction method such that said open part is a slot, in the door construction method described in Claim 1

6. A construction method such that said spline is metal, in the door construction method described in Claim 1.

7 A construction method such that said spline is adhered inside said open part, in the door construction method described in Claim 1.

8 In the door construction method described in Claim 5,

d. a construction method provided with an additional step in which a wooden plug is inserted into each end of said open part and said metal spline is hidden by this.

9. In the door construction method described in Claim 6,

a construction method provided with an additional step in which said [sic] additional /2
lumber tie plate is adhered to the lateral edge enclosing said open part, said metal spline is accepted matched with the end of said open part, and said additional lumber tie plate will have a stop hole to hide it because of this.

10. In the door construction method described in Claim 1,

a construction method that additionally includes: d. a step for polishing one side of said lumber tie plate to a finished state and producing a semi-finished door product with this,

e. a step for attaching a template that has a guide groove on the opposite side of said semi-finished door product from said finished side,

f. a step for placing said semi-finished door product on a router that has a table and a cutter so that a guide pin that projects upward from said table of said router locks in said guide groove of said template. [and]

(g) a step for moving said semi-finished door product so that said guide pin will remain in said guide groove and by this, said [sic] pattern delineated by said guide groove of said template will be reproduced on said semi-finished door product by said cutter of said router.

[The numbers in the right margin indicate pagination of the original foreign text.]

11. As the door,

a. a door that includes multiple lumber tie plates no more than 6.35 mm (2-1/2 inches) thick bonded side-by-side to each other, where the grain of adjacent lumber tie plates is arranged in opposite directions. said lumber tie plates have at least one open part that extends across them in which a spline is furnished.

12. A door such that said lumber tie plates are roughly the same length. in the door described in Claim 11.

13. A door such that said lumber tie plates are roughly the same width. in the door described in Claim 11.

14. A door such that said open part is a hole. in the door described in Claim 11.

15. A door such that said open part is a slot. in the door described in Claim 11.

16. A door such that said spline is metal. in the door described in Claim 11.

17. A door such that said lumber tie plates are adhered together. in the door described in Claim 11.

18. A door such that said spline is adhered inside said open part. in the door described in Claim 11.

19. A door such that a wooden plug is placed in each end of said open part and said metal spline is hidden by them. in the door described in Claim 16.

20. A door such that a first open part near one end of said lumber tie plate and a second open part near the opposite end of said lumber tie plate are furnished. in the door described in Claim 1

21. A door such that

a. it includes multiple lumber tie plates that are adhered together side-by-side. that are no more than 63.5 mm (2-1/2 inches) wide. and have roughly the same length and depth: the grain of adjacent lumber tie plates is arranged in opposite directions. and in said lumber tie plates. there is a first matching slot that extends across it at one end and a second matching slot that extends across it at the opposite end of said lumber piece.

b. and that includes a wooden spline placed in each of said slots

22. As the door. a door

a. that includes multiple lumber tie plates that are adhered together side-by-side. that are no more than 63.5 mm (2-1/2 inches) wide. and have roughly the same length and depth: the grain of adjacent lumber tie plates is arranged in opposite directions. and in said lumber tie plates. there is a first matching hole that extends across it near one end and a second matching hole that extends across it near the opposite end of said lumber tie plate.

b. and it includes a metal spline placed in each of said holes.

c. and a wooden plug that is placed in each end of said holes and that hides said metal spline with that.

23. A door, /3

a. that includes multiple lumber tie plates that are adhered together side-by-side, that are no more than 63.5 mm (2-1/2 inches) wide, and have roughly the same length and depth; the grain of adjacent lumber tie plates is arranged in opposite directions, and in said lumber tie plates, there is a first matching hole that extends across it near one end and a second matching hole that extends across it near the opposite end of said lumber tie plate,

b. and that includes a metal spline placed in each of said holes,

c. and said additional lumber tie plate adhered to the side edge that includes said hole, said metal spline is accepted matched with the end of said hole and is hidden by said additional lumber tie plate has a stop hold.

24. A door construction method

a. that includes a step for adhering multiple lumber tie plates, each of which has a width of no more than 63.5 mm (2-1/2 inches) and roughly the same length, together side-by-side, with the grain of adjacent lumber tie plates arranged in opposite directions.

b. and that includes a step for forming at least two slots – a first slot in one end of said lumber tie plate and a second slot in the opposite end of said lumber tie plate – across said lumber tie plate,

c. and a step for inserting a metal spline into each of said slots.

25. A door construction method

a. that includes a step for adhering multiple lumber tie plates, each of which is no more than 63.5 mm (2-1/2 inches) wide and roughly the same length, together side-by-side, with the grain of adjacent lumber tie plates arranged in opposite directions.

b. that includes a step for forming at least two holes – a first hole near one end of said lumber tie plate and a second hole near the opposite end of said lumber tie plate – across said lumber tie plate,

c. a step for inserting a metal spline into each of said holes,

d. and a step for inserting a wooden plug into each end of said holes and hiding said metal spline with them.

26. A door construction method,

a. that includes a step for adhering multiple lumber tie plates, each of which is no more than 63.5 mm (2-1/2 inches) wide and roughly the same length, together side-by-side, with the grain of adjacent lumber tie plates arranged in opposite directions.

b. and that includes a process for forming at least two holes – a first hole near one end of said lumber tie plate and a second hole near the opposite end of said lumber tie plate, across said lumber tie plate,

c. a process for inserting a metal spline into each of said holes,

d. and a process for adhering an additional lumber tie plate of the same depth, width and length and that has a stop hole for accepting said metal spline at each end of said holes and hiding said metal spline with that.

27. For the door construction method described in Claim 22, 23 or 24,

a construction method that includes: e. a step for polishing one side of said lumber tie plate to a finished state and producing a semi-finished door product by that,

f. a step for attaching a template that has a guide groove to the opposite side of said semi-finished door product from said finished side,

g. a process for placing said semi-finished door product on a router that has a table and a cutter so that a guide pin that projects upward from the table of said router locks into said guide groove of said template.

h. and a step for moving said semi-finished door product so that said guide pin will stay in said guide groove, and because of this, said pattern delineated by said guide groove of said template will be reproduced on said semi-finished door product by said cutter of said router.

Detailed explanation of the invention

Industrial application field

The present invention relates to a door construction method, such as for a cupboard door. /4

Prior art

With cupboard doors made from a single piece of lumber, warping in both length and width directions is unavoidable. To overcome this problem, a construction method for cupboard doors using five pieces of lumber has been developed by the industry, and four pieces of lumber are used to form a rectangular frame. The lumber pieces must be finished with a router prior to assembly in order to form a pattern that is visible when the lumber is assembled. Once the frame is formed, yet another lumber piece is inserted into the frame to serve as the center panel. However, there are many disadvantages to this type of construction and there are adverse effects on the aesthetic appearance of the cupboard door.

Problems to be solved by the invention

One general form of aesthetic shortcoming relates to the bonding of the frame component elements. Four bond locations must be cut out to form one frame. The cutting of these bond

locations requires a large amount of effort, and no small number of parts of all the bond locations are cut with gaps remaining, regardless of the skill of the worker. Even when the bond locations are cut as accurately as humanly possible, there is the possibility of still encountering gaps at a later time due to contraction of the lumber. With contraction, or as the lumber dries, [gaps] are also present in the center panel, which has a tendency to become loose and unsteady.

Another general form of aesthetic shortcoming relates to finishing of the lumber surface. The grain of the four pieces of lumber that form the frame inevitably passes longitudinally relative to the longitudinal axis of the side pieces and laterally relative to the longitudinal axis of the end pieces of the door, making it difficult to avoid polishing across the grain, which unfavorably affects finishing. Even when care is taken to coordinate the lumber when the frame is constructed, it is very difficult to obtain the appropriate grain and color that coordinate with the center panel.

The final form of aesthetic shortcoming relates to the decorative pattern traditionally placed on the cupboard door. The frame and center panel must be routed separately, and this limits the selection of patterns useful for the consumer. Obtaining a pattern on the frame that can be extended attractively to the center panel, while not impossible, is difficult.

Means to solve the problems

One major objective of the present invention is to provide a door construction method that maintains high resistance to warping and, on top of that, produces a finished product on which various unrestricted patterns can be routed as a result.

With the present invention, a construction method is obtained that includes first a step for adhering multiple lumber tie plates of roughly the same length together side-by-side where the grain of adjacent lumber pieces is arranged in opposite directions, that secondly includes a step for forming at least one open part that passes across the lumber pieces, and thirdly that includes a step for inserting a spline into the open part, for a door construction method.

Another major objective of the present invention is to provide a door that will maintain high resistance to warping and, on top of that, with which various unrestricted patterns can be routed.

With the present invention, a door board composed of multiple lumber tie plates that are bonded side-by-side to each other is obtained. The grain of adjacent lumber tie plates is arranged in opposite directions, the assembled lumber tie plates have at least one open part that extends across them, where a spline is placed.

Other characteristics of the present invention in addition to those above will become apparent from the following explanation that cites the attached figures.

Application example

A preferred embodiment of the present invention will be explained below related to Figures 1-8. Three door construction methods that can be implemented commercially will be explained. All three methods are interrelated, but slight differences have been developed to satisfy certain specific requirements. The methods to be explained were initially developed with a cupboard door in mind, but the methods can be used to produce doors of different types, so the present invention has even broader application. Regardless of the construction method, the entire door is indicated with reference numeral (10). /5

A first method of the door construction methods is shown in Figure 1. This exploded oblique view shows all the component elements of door (10) assembled according to the following steps. First, multiple lumber tie plates (12) are adhered together side-by-side. It is desirable that the lumber tie plates be no more than 63.5 mm (2-1/2 inches wide) and roughly the same length, if possible. It is important that the lumber tie plates be arranged so that the grain of adjacent lumber tie plates will run in opposite directions. The purpose of arranging the grain in opposite directions is so that door (10) will not warp longitudinally. In order to make this circumstance of the present invention more evident, it is conceivable that door (10) have a top part (14) and a bottom part (16). One of the lumber tie plates identified as (18) is adjacent to lumber tie plates (20) on both sides. When the grain of tie plate (18) runs longitudinally toward top part (14) of door (10), the grain of (20) must be arranged to run longitudinally toward bottom part (16). Lumber tie plate (18) has a natural tendency to warp, but this tendency is hindered by adjacent tie plates (20) that are arranged in the opposite direction and thus have a tendency to warp in the opposite direction.

It is desirable that the width of lumber tie plates (12) that constitute door (10) be kept to less than 63.5 mm (2-1/2 inches). The reason for this is that when width exceeds 63.5 mm (2-1/2 inches), there is the risk of the individual tie plates warping laterally.

Second, at least two slots (22) and (24), namely, first slot (22) for top part (14) in lumber tie plates (12) and second slot (24) for bottom end part (16) in lumber tie plates (12), are formed across lumber tie plates (12).

Third, a wooden spline (30) is adhered in each slot (22) and (24). Wooden spline (30) is useful for reinforcing door (10), and door (10) is prevented from warping laterally because of it.

A door (10) produced according to the first of the above-mentioned methods will be explained next.

Door (10) has multiple lumber tie plates (12) that are bonded together side-by-side, and that have a width of no more than 63.5 mm (1-1/2 inches) and roughly equal length and depth. The grain of adjacent lumber tie plates (12) is arranged to face in opposite directions. There is a first arranged slot (22) that extends across them at one end (14) and a second arranged slot (24) that

extends across them at the opposite end (16) in the assembled lumber tie plates (12). A wooden spline (30) is placed in each of aforementioned slots (22) and (24) and, preferably, adhered.

A second method of the door construction methods is shown in Figure 2. This method was developed when it was discovered that when wooden spline (30) used with the first method encounters contraction under certain environmental conditions and is put in place, the aesthetic appearance is therefore affected. What was specifically conceived was a situation in which the material is damp at the time of construction or that the humidity at the assembly location is high.

This second method is composed of the steps explained below. First, preferably, multiple lumber tie plates (12) no more than 63.5 mm (2-1/2 inches) wide and fourthly the same length are adhered together side-by-side.

First, as mentioned in the explanation of the first method, lumber tie plates (12) must be oriented so that the grain of adjacent lumber tie plates is arranged in opposite directions. Second, at least two holes (32) and (32), namely, first hole (32) near top end part (14) of lumber tie plates (12) and second hole (34) near bottom end part (126) of lumber tie plates (12) are formed across lumber tie plates (12). Third, a metal spline (36) is inserted into each hole (32) and (34). Metal spline (36) does not contract, and therefore greater reinforcement than that using wooden spline (30) is achieved. Metal spline (36) can be inserted at a fixed position most easily when it is round, but a metal spline that has a rectangular or triangular cross section can be used with the same results. A round metal spline is preferable for the simple reason that, in order to hold metal splines (36) together and accommodate them with boards, it is easier to produce a round hole than rectangular or triangular ones. Fourth, wooden plugs (38) are inserted into the end parts (40) of holes (32) and (32) and the ends of metal splines (36) are covered by them. Door (10) is more aesthetically pleasing if metal splines (36) are not visible. Wooden plugs (38) are inserted so that they are in the same plane as edge (26) or (28) of door (10). /6

Door (10) produced according t the second of the above-mentioned methods will be explained next.

Multiple lumber tie plates (12) no more than 63.5 mm (2-1/2 inches) wide and with roughly the same length and depth are adhered together side-by-side. Adjacent lumber tie plates (12) are arranged so that the grain of adjacent tie plates will run in opposite directions. Each lumber tie plate (12) has a first hole (32) that extends across it near one end (14) and a second hole (34) that extends across it at the opposite end (16). The holes in each tie plate are made so that the assembled door is provided with holes aligned extending across both the top part and bottom part. A metal spline (36) is placed in each hole (32) and (34). Wooden plugs (38) are placed in the ends (40) of holes (32) and (34), and metal spline (36) is hidden by them.

A third method of the construction methods for door (10) is shown in Figure 3. This method was developed to replace the production method using wooden plugs (38) which is

considered as encompassing a detailed operation requiring significant effort. This third method is composed of the steps that will be explained next. First, preferably, multiple lumber tie plates (12) no more than 63.5 mm (2-1/2 inches) wide and that have roughly the same length are adhered together side-by-side. As mentioned in the explanations of the first and second methods, lumber tie plates (12) must be assembled so that the grain of adjacent lumber tie plates (12) is arranged in opposite directions. Secondly, at least two holes (32) and (32), namely, first hole (32) near top end part (14) of lumber tie plates (12) and second hole (34) near bottom end part (16) of lumber tie plates (12) are formed across lumber tie plates (12). Third, a metal spline (36) is inserted into each hole (32) and (34). Fourth, an additional lumber tie plate (42) of the same width and length is adhered along edges (26) and (28) of door (10). There is a stop hole (44) in lumber tie rods (12). It accepts metal spline (36) matched with end parts (40) of holes (32) and (34), and it is hidden by them. In this construction method, metal splines (36) must be extended into stop holes (44) to provide the desired reinforcement.

A door (10) produced according to the third of the above-mentioned methods will be explained next. Door (10) has multiple lumber tie plates (12) that are adhered together side-by-side and, preferably, a width of no more than 63.5 mm (2-1/2 inches) and roughly the same length and depth. The lumber tie plates are assembled so that the grain of adjacent tie plate is arranged in opposite directions. Lumber tie plates (12) have a first hole (32) that extends across them near one end (14) and a second hole (34) that extends across them near the opposite end (16). The assembled lumber tie plates therefore produce a door that has aligned holes that extend across it near both the top part and the bottom part. A metal spline (36) is placed in each hole (32) and (34). There is a stop hole (44) in tie plate (42), along edges (26) and (28), that is matched with end parts (40) of holes (32) and (34) and that houses and hides metal spline (36).

The major commercial benefit provided by the above-mentioned methods is that taking into account the forming of patterns in door (10) is sufficiently realized for the first time. A method for forming patterns on door (10) is shown in Figures 4-8. For the purpose of explanation, a door that has not yet been patterned, but is provided with a finish and is polished, is called a "semi-finished door product." While semi-finished door products are mechanically complete doors, they have not been provided with a pattern that increases their aesthetic appeal, and thus their commercial value. To place a pattern on a door, the steps explained below are desirable. First, one side (46) of door (10) has a finish applied such as stain, paint or lacquer, it is then polished, and thus a semi-finished door product (48) is produced. It can be seen that when a door (10) is constructed using any one of the methods explained, the grain will all run longitudinally. The polishing process is simplified by the grain all running longitudinally and a finish will be possible that is far superior to what was provided previously using a door with a frame type explained as the

prior art background. Second, a template (50) that has guide groove (52) is attached to side (51) /7
of semi-finished door product (48) on the opposite side from polished side (46).

Template (50) can be produced in various unrestricted patterns. The pattern is delineated by guide groove (52) positioned on side (53) of template (50). The method of attaching semi-finished door product (48) to the template (50) is shown in Figures 4 and 5. Template (50) is produced to the same width and length as semi-finished door product (58). Multiple triangular projections (54) are attached to edge (56) of template (50) to prevent shifting between template (50) and semi-finished door product (48). Third, semi-finished door product (48) and template (50) are placed on router (58) so that guide pin (60) that projects upward from table (62) of router (58) locks into guide groove (50) of template (50). Fourth, guide pin (60) remains in guide groove (52), and because of this, semi-finished door product (48) is moved so that the pattern delineated by guide groove (52) of template (50) is reproduced on semi-finished door product (48) by cutter (64) of router (58).

Here, lumber tie plates of approximately equal length and width were mentioned, but it is understandable that lumber tie plates of unequal length and width may be expected. If the assembled cupboard door is rectangular or square as in regular applications, the lumber tie plates that constitute the cupboard will be equal length. Depending on the assembly technology in use, it should be understood that the tie plates are cut to equal length beforehand or they can be cut to a specific length after they are adhered together side-by-side. For more decorative applications, it is conceivable that assembled doors having outlines with a curved top and bottom, or diamond shaped, triangular or even more unusual shapes will be desirable. Clearly, in the case of this type of application, the lumber tie plates are not of equal length. In the same way, cases in which special patterns that can be accomplished by assembling lumber tie plates that have different thicknesses are also possible. In such cases, the tie plates are not of equal depth.

In addition, this disclosure is associated with the use of splines at both the top and bottom parts of the assembled door. However, it should be understood that producing a door such that only a single spline is used, and, for example, it is placed in the center between the top part and bottom part falls within the scope of the present invention. This type of structure can be used when the door is short or when a shape other than a rectangle is used.

The present invention was explained in detail associated with specific application examples, but it should be understood that other variations are possible that do not stray from the spirit and scope of the present invention.

Brief description of the figures

Figure 1 is an exploded oblique view of one form of preferred embodiment of the present invention. Figure 2 is an exploded oblique view of the second form of preferred embodiment of the

present invention. Figure 3 is an exploded oblique view of a third form of preferred embodiment of the present invention. Figure 4 is an oblique view of a preferred embodiment of the present invention and of a template. Figure 5 is an oblique view of a preferred embodiment of the present invention and a template on a router. Figure 6 is a cross section of a preferred embodiment of the present invention for cut line 6-6 in Figure 5. Figure 7 is a plan view of the front surface of a preferred embodiment of the present invention. Figure 8 is a plan view of the back side of a template used to produce a pattern for a preferred embodiment of the present invention.

(10):	Door	(51), (46):	Side
(12), (42):	Tie plate	(48):	Semi-finished door product
(22), (24):	Slot	(50):	Template
(26), (28):	Edge	(52):	Guide groove
(30):	Wooden spline	(58):	Router
(32), (34):	Hole	(60):	Guide pin
(36):	Metal spline	(62):	Table
(38):	Wooden plug	(64):	Cutter
(42):	Stop hole		

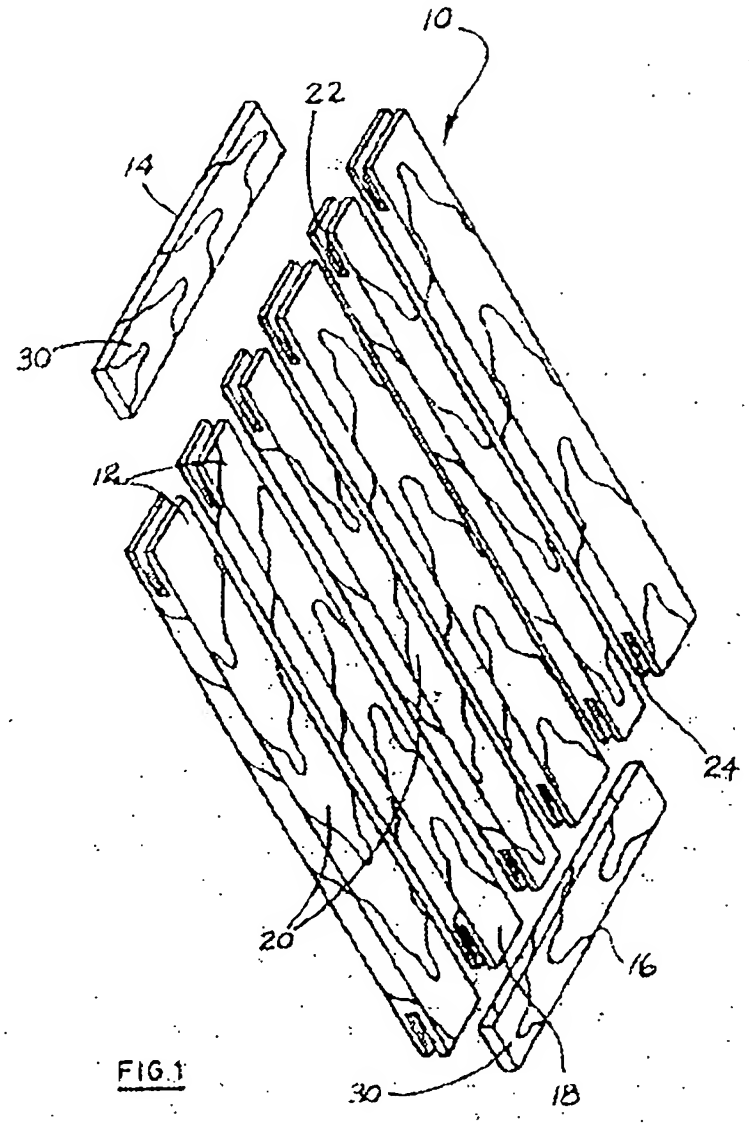

FIG. 1

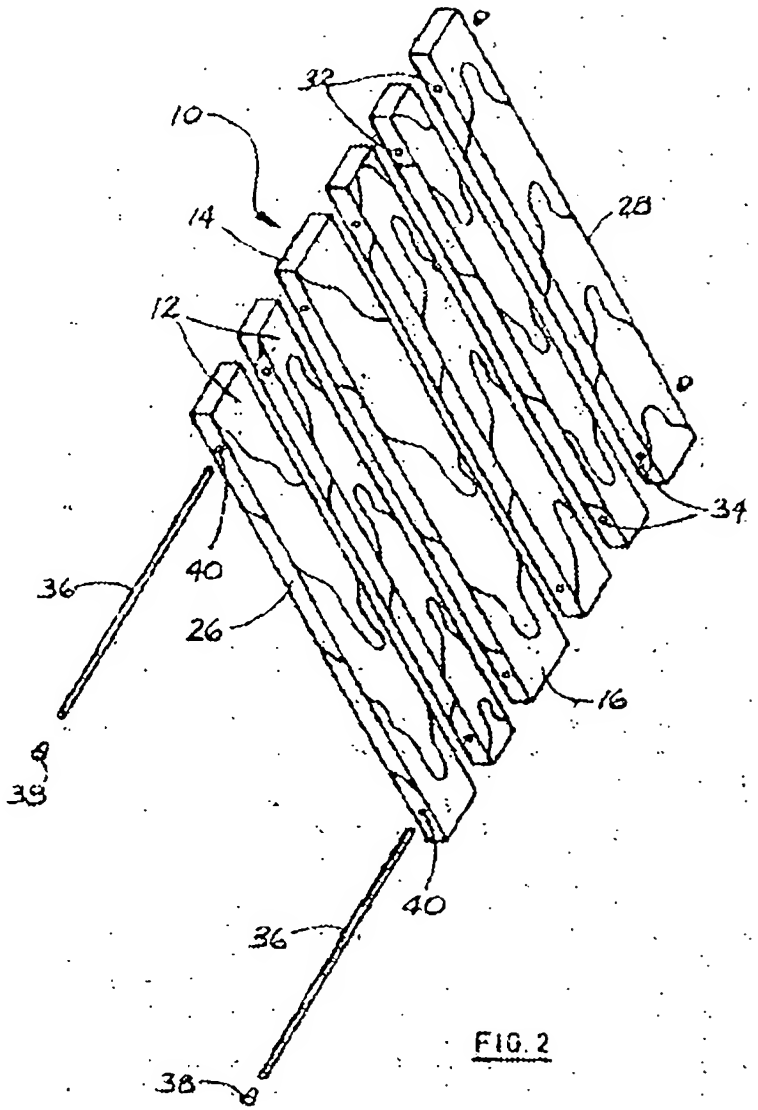

FIG. 2

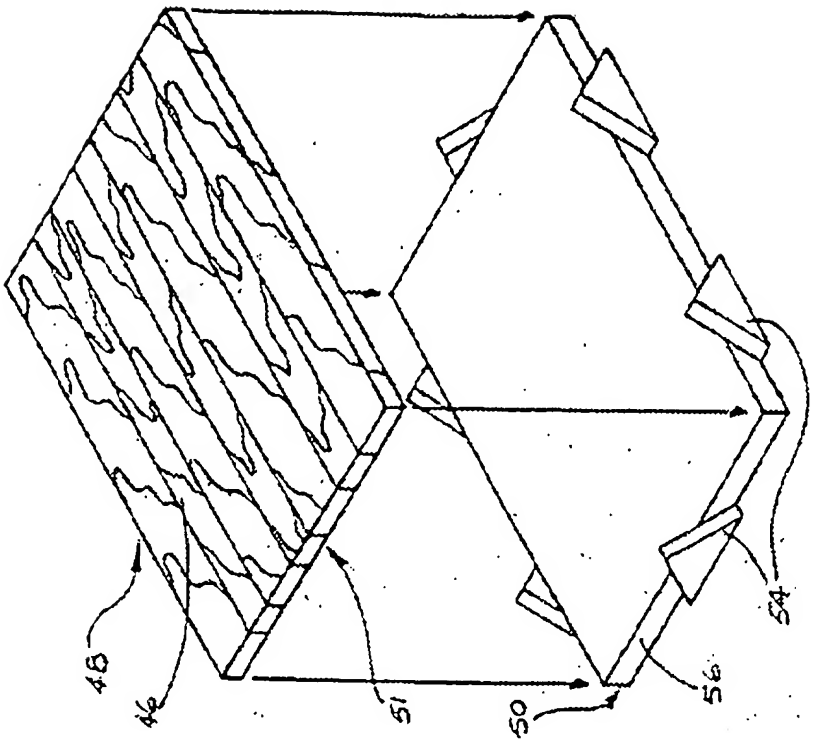

FIG. 4

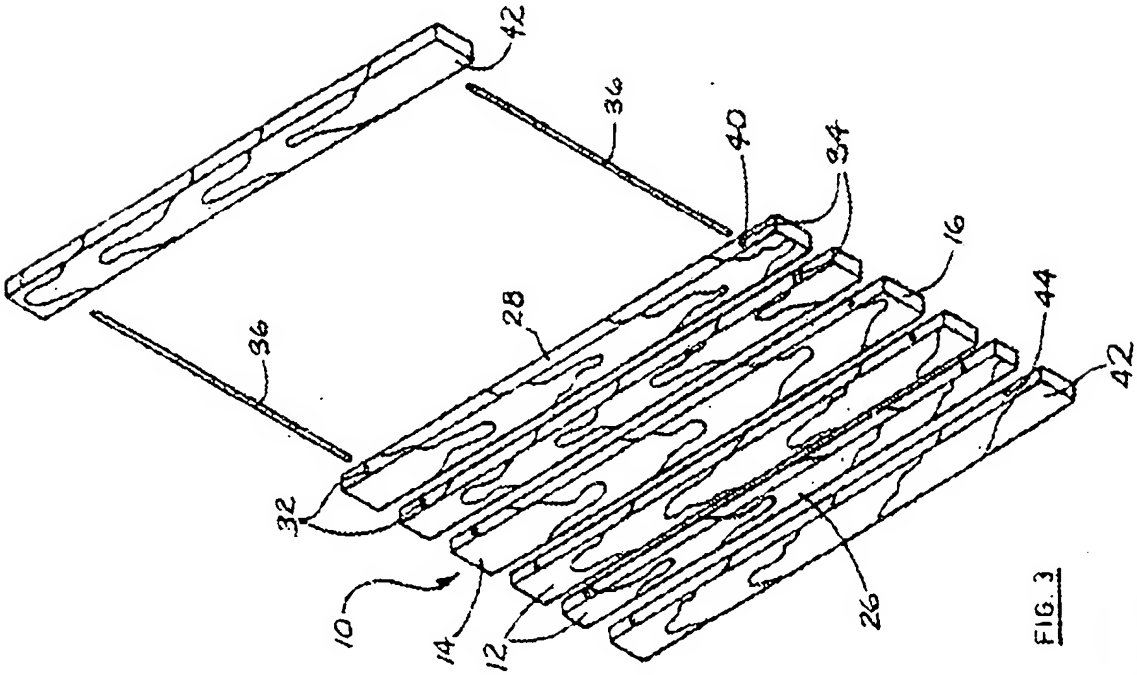

FIG. 3

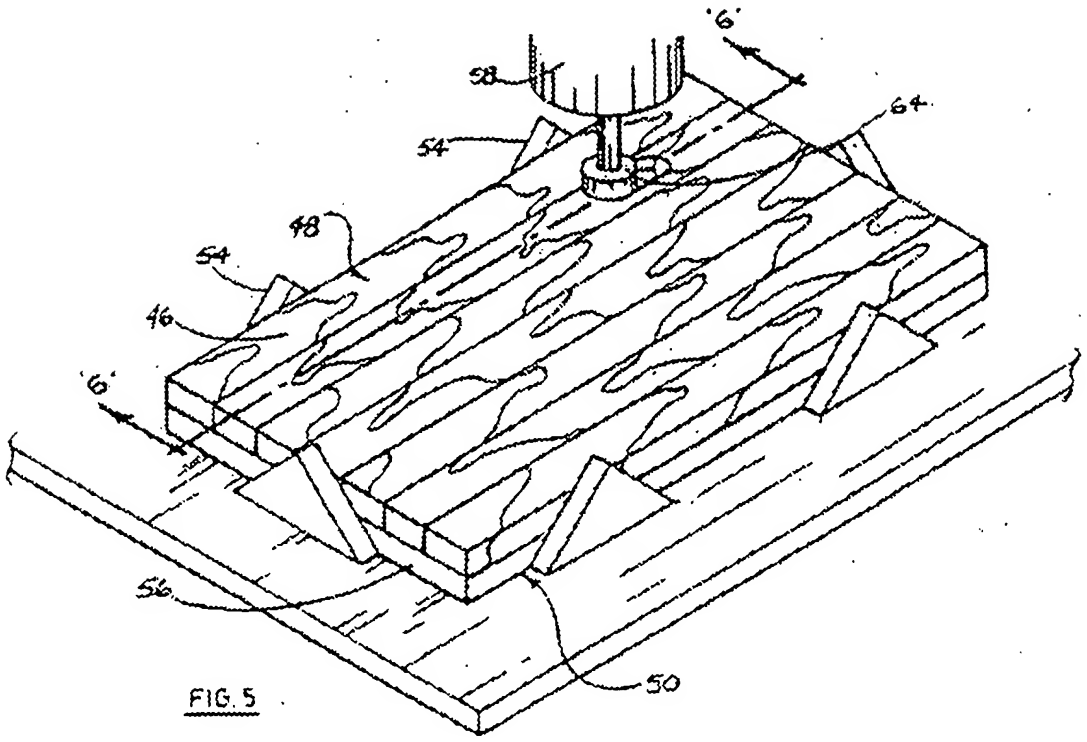

FIG. 5

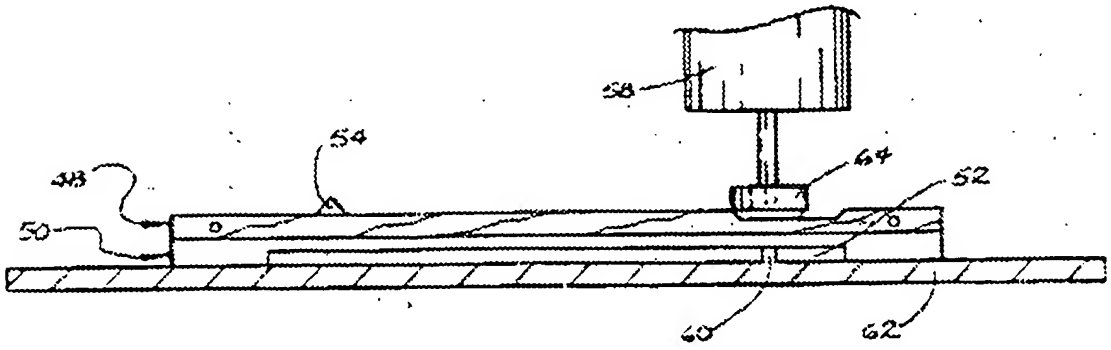

FIG. 6

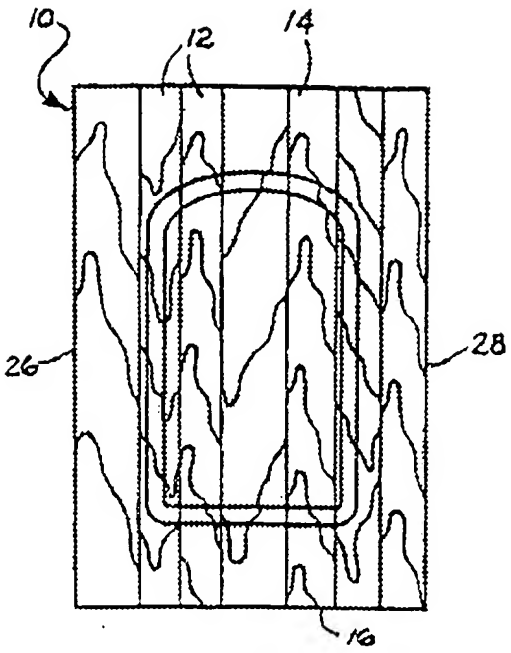

FIG.7

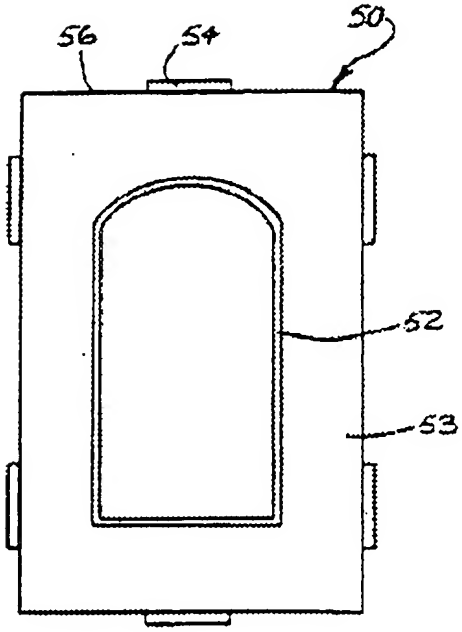

FIG.8

X.

RELATED PROCEEDINGS APPENDIX

NONE